IF VISUAL WATER CLARITY IS THE ISSUE, THEN WHY NOT MEASURE IT?

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Abstract
Much water quality monitoring involves measuring suspended solids concentration (SSC). However, the impact of SS is often related to its light attenuation, which reduces visual water clarity and light available for photosynthesis. Thus, measurement of the optical attributes of the suspensoids is often more relevant than SSC.

Nephelometric turbidity, an index of light scattering by suspensoids, is widely used as a simple and cheap, instrumental surrogate for SSC. Turbidity may relate more directly than mass concentration to optical effects of suspended matter. But turbidity is only a relative measure of light scattering (versus arbitrary standards), albeit a useful quantity where a relative index of water cloudiness is sufficient. Turbidity has no intrinsic environmental relevance until calibrated to a 'proper' scientific quantity. Worse, owing to different optical design, different turbidimeters may give very different responses on the *same* samples.

Visual water clarity (measured as Secchi or black disc visibility) is a preferred optical quantity to turbidity, and one with immediate environmental relevance to aesthetics, contact recreation and fish habitat. Contrary to common perception, visual clarity measurement is not particularly subjective, and is more precise than turbidity measurement. Visual clarity measured as horizontal black disk visibility is inter-convertible with beam attenuation, a fundamental optical quantity that can be monitored continuously by beam transmissometry.

This paper discusses the merits of *in situ* visual water clarity measurement over alternative measures. We emphasize the black disk method—a simple, quick, and cheap measurement, yielding real time information that can provide a valuable on-site guide to sampling in water quality monitoring work. Black disc visibility has the great merit of being readily understood by lay people.

We believe that visual water clarity (or, equivalently, beam attenuation) should supplant nephelometric turbidity in many water quality applications, including environmental standards.